

Lab 6 – Work and Energy

Questions

1. Look at the graph of the average stopping distance versus the average velocity. Now look at the graph of the average stopping distance versus the average kinetic energy.
(a) Which of these graphs shows a linear relationship? (b) Which of these graphs shows a non-linear relationship? (c) What can be said about the relationship between the average stopping distance and the average velocity?
 - (a) The average stopping distance versus the average kinetic energy is a linear graph.
 - (b) The average stopping distance versus the average velocity is a non-linear graph.
 - (c) We can conclude that the average velocity grows much quicker than the average stopping distance. In fact, the average velocity grows twice as quickly as the average stopping distance.
2. Compare and discuss the the potential energies and the kinetic energies found in this experiment.
 - † The potential energies are greater than the kinetic energies. This is the potential energy was not only converted to kinetic energy but was also converted to heat because of friction.
3. What formula was used to find the velocity of the car as it left the vertical portion of the track?
 - † The formula that was used is given by

$$\begin{aligned}PE &= KE \\ mgh &= \frac{1}{2}mv^2 \\ \Rightarrow v &= \sqrt{2gh}\end{aligned}$$

4. A car traveling 50 mph takes 100 feet to stop. How much distance does it take for a car traveling 100 mph to stop?
 - † The equation to solve this is given by

$$Fd = \frac{1}{2}mv^2$$

- † It can be shown that it will take 400 feet for the car to stop.
5. Look at the average velocity versus height graph and the average velocity squared versus height graph. (a) Which of these graphs shows a linear relationship? (b) Which of these graphs shows a non-linear relationship? (c) What does this say about the relationship between the average velocity and the height?

- (a) The average velocity squared versus height graph shows a linear relationship.
- (b) The average velocity versus height graph shows a non-linear relationship.
- (c) The average velocity grows faster than the height does.